Title: Be A Smart Consumer

Brief Overview:

This learning unit provides a variety of strategies and activities to thoughtfully engage students in the application and practice of number concept, decimal computation, and problem solving skills. Students will examine actual food packages and record net weights in a table, then perform estimated and exact calculations using this real life data. They will use information provided to determine the "best" buy on selected ingredients by finding unit rates. Additionally, students will make selections from a restaurant menu to stay within a designated budget while including the necessary sales tax. The culminating performance assessment integrates the practiced skills, and requires students to write an explanation for choices made.

NCTM 2000 Principles for School Mathematics:

- **Equity:** *Excellence in mathematics education requires equity - high expectations and strong support for all students.*

- **Curriculum:** *A curriculum is more than a collection of activities: it must be coherent, focused on important mathematics, and well articulated across the grades.*

- **Teaching:** *Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well.*

- **Learning:** *Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.*

- **Assessment:** *Assessment should support the learning of important mathematics and furnish useful information to both teachers and students.*

- **Technology:** *Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning.*

Links to NCTM 2000 Standards:

- **Content Standards**

<u>Number and Operations</u>

The activities in this learning unit assist students in becoming proficient in computation and estimation of whole numbers, decimals, and percents as they work with them meaningfully in the situations presented. These activities build on students' prior knowledge of whole number concepts and their encounters with decimals and percents in lower grades and everyday life. The students will apply appropriate methods for computing – estimating, paper and pencil, and calculators depending on the situation. They will judge the reasonableness of their results using estimation strategies. Students will gain experience in understanding the

meaning and effects of arithmetic operations with decimals as they complete the three activities, homework, and the performance assessment.

- **Process Standards**

Problem Solving

As students perform the three activities, in context, they will see how mathematics can be useful in their everyday lives. Also, their facility with computation and estimation with decimals is developed through experiences involving a range of practical uses. Independent and collaborative problem solving experiences are woven throughout the learning unit.

Communication

Students are required to express their thinking orally and in writing. They are asked to organize information and draw conclusions from their computations. Through the activities, students will learn valuable lessons about the need for accuracy and completeness in their written work.

Connections

The contexts of the three activities involve connections to the real world and to the daily life experiences of the students. By using previously understood ideas in a new context, students are enhancing their understanding of decimals and computation. These activities serve as a way to revisit mathematical ideas and help students see the usefulness of mathematics in school and at home.

Grade/Level:

Grades 6 – 8, General Mathematics, Beginning of the school year

Duration/Length:

Four, ninety-minute class periods

Prerequisite Knowledge:

Students should have working knowledge of the following skills:

- Estimating, rounding, and place value
- Adding, subtracting, multiplying, and dividing decimals
- Finding the percent of a number
- Comparing and ordering decimals
- Converting fractions to decimals
- Converting percents to decimals
- Using basic calculator skills

Student Outcomes:

Students will:

- Compare net weights (in ounces) of food packages.
- Find the unit rate and total price of items.
- Make decisions as to best buy.
- Calculate totals, tax, and final cost.
- Record and keep expenses within a budget.
- Share findings by means of discussions, activities, homework, and on-going assessments.
- Write to inform concerning procedures for finding the unit rate and total cost with sales tax.

Materials/Resources/Printed Materials:

- Activity Packets (1 – 3) and optional transparencies for teacher
- Homework for activities
- Performance Assessment Packet
- Food packages with whole number and/or one or two decimal place net weights (in ounces) (approximately 3 per student)
- Teacher demo boxes of spaghetti and lasagna (two brands of each)
- Price tags for teacher demo
- Pencils and paper
- Calculators

Development/Procedures:

Day 1 – "What's for Dinner?"

The teacher will have actual food packages with whole number, as well as, one and two decimal place net weights (in ounces) arranged on trays in the center of desks, arranged into tables, for students to examine. Depending on the size of the class, there should be approximately five students assigned to each table at the onset of the activity.

- Teacher will distribute Activity 1 packet to each student and review instructions for completion of the table provided.
- Calculators should be available for students to check totals.
- Teacher should monitor student recordings and signal when it is time for students to rotate to another table to record different items.
- Students will work independently to determine the necessary computations (addition or subtraction) and write either the estimated and exact sums or differences.
- Students will order the weights of all items recorded from least to greatest.
- Students will write their own questions for a classmate to answer involving the net weights and addition or subtraction computation.
- Students will exchange packets with a classmate to complete the student- authored

problems.
- Students will complete worksheet using food packages found at home.

Day 2 – "Dinner for Friends"

Teacher will bring in several items on the supply list for demonstration of the lesson activities and attach prepared price tags.

- Teacher will ask students to compare two prices for the same product and model the necessary computations to find unit prices.
- Students will compare prices from two different brands, and will use the provided table to record items purchased with the unit prices. They will compute the unit prices using decimal division, and will verify their results with a calculator.
- Student will write an explanation of how they decided which brand would be the better buy.
- Students select as many items as they would like to serve for dinner. They will multiply by the unit price decimals to find how much they will spend for each item. They will then add the decimals to find the total cost of the dinner.
- Students will complete worksheet determining unit prices to solve problems.

Day 3 - "Pasta Cuisine"

Teacher will review orally with students how to convert percents to decimals and fractions to decimals. Optional: teacher may want to review the different parts of a menu.

- Teacher will distribute Activity 3 packet to each student and review instructions for completion of the activity.
- Calculators should be available for students to check totals.
- Students will be able to read a menu, and select items for a family of four that does not exceed a budget of $60.00.
- Students will then calculate the sales tax, and the final cost of their meal, to see how close they can come to spending the maximum amount without going over budget.
- Students will complete worksheet by calculating the sales tax and/or the total cost.

Performance Assessment:

Student progress will be assessed throughout the unit using scoring keys and rubrics. Following Day 3's activity, a more formal performance assessment should be administered (see packet). This culminating activity requires students to be engaged, and demonstrate an understanding of all skills used within the unit. It also contains a writing component where students will be able to communicate their understanding using numbers and words. The entire performance assessment will be scored using a rubric, previously shared with the

students.

Extension/Follow Up:

- Students bring in sales advertisements from neighborhood grocery stores or other types of consumer ads to compare unit prices on similar items.
- Actual restaurant menus could be used to select meals, calculate totals, including tax and gratuity, within a budget.
- Students can design a poster displaying decimals used in everyday life.

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Day1 **Activity 1**

What's For Dinner?

Use these tables to record your data.
Classify the food items on your tray.

BREAKFAST	LUNCH	DINNER	OTHER

Select two food items from your tray. Examine each package carefully, and record the NET WEIGHT (WT.) in ounces (OZ.) beside each name.

FOOD ITEM	WEIGHT (in ounces)	Weight ROUNDED (to the nearest whole oz.)
	TOTAL NET WT.	ESTIMATED TOTAL NET WT.

Complete the table by rounding each weight to the nearest whole ounce, and then add each column to find the totals. Use a calculator to check your work

Use the data from your table and paper/pencil to help answer the following.

What is the sum of your two heaviest items?
Estimated Exact

How much is the TOTAL NET WT. minus the weight of the lightest item?
Estimated Exact

Add the weights of two items with different decimal place values.
Estimated Exact

Subtract the weights of two items with different decimal place values.
Estimated Exact

Select 3 items from the list that would weigh **about** 30 ounces combined.
Estimated Exact

How close did you come to a total weight of 30 oz.?

Order the **exact** weights of the items in your table from **least to greatest**.

1)
2)
3)
4)
5)
6)
7)
8)
9)
10)
11)
12)

How much heavier is the item with the most weight than the lightest item? Write the problem and solve.

Estimated Exact

Write four problems for a classmate to solve using the weights of your selected items – two addition and two subtraction.
Ask them to estimate first, and then find the exact sum or difference.

Day 1

Homework

Ask permission from your parents to search your family's pantry for five examples of foods that have decimals as part of their NET WEIGHT (WT.) in ounces (OZ.). Complete the data table below by listing the name of each item and its exact weight as written on the package. Round each exact weight to the nearest whole ounce, and record it in the section labeled "Estimated Weight". Find the total of the weights in each column.

Name of Food	**Exact Net Weight (in ounces)**	**Estimated Weight (in ounces)**
	TOTAL NET WT.	**TOTAL** Estimated WT.

List the weight of the five food items from **least to greatest**.

1)
2)
3)
4)
5)

Find the estimated and exact sum of the two heaviest items.

ESTIMATED EXACT

Find the estimated and exact difference between the weights of the heaviest item and the lightest item.

ESTIMATED EXACT

Day 2 Teacher Resource

Garlic bread 13 ounces $3.00 ○	Ice cream 2 quarts $5.00 ○	Frozen pizza 18 ounces $13.50 ○
Italian Dressing 16 ounces $3.00 ○	Garlic bread 16 ounces $3.75 ○	Ice cream ½ quart $2.00 ○
Spaghetti $1.50 per package ○	Italian dressing 8 ounces $1.70 ○	○
Lasagna 1 pound $1.40 ○	Spaghetti 3 packages for $3.60 ○	○
Spaghetti sauce 32 ounces $3.20 ○	Lasagna 2 pounds $2.60 ○	○
Mozzarella 12 ounces $3.00 ○	Spaghetti sauce 26 ounces $2.20 ○	○
Parmesan 7 ounces $4.20 ○	Mozzarella 6 ounces $3.00 ○	○
Frozen pizza 9.2 ounces $6.00 ○	Parmesan 6 ounces $3.00 ○	○

Day 2

Activity 2
Labels and Unit Pricing

Directions: You are planning an Italian dinner for three of your friends. (You are serving dinner for four.) You already have drinks at home, and you are going to the grocery store to buy the ingredients. You are undecided about whether you would like to make spaghetti, lasagna, or a frozen pizza.

Below is a list of groceries you may want to purchase. Working with a partner, find the unit prices. Round your answer to the nearest cent, and record your results in the second and third columns of the chart. Show your work. Use a calculator to check your answers.

Food item	**Brand 1**	**Brand 2**
Tomatoes	3 for $2.90	2 for $1.50
Salad	2 pounds for $2.25	3 pounds for $3.75
Italian dressing	16 ounces for $3.00	8 ounces for $1.70
Garlic bread	13 ounces for $3.00	16 ounces for $3.80
Spaghetti	2 packages for $3.00	3 packages for $3.60
Lasagna noodles	3 pounds for $4.20	2 pounds for $2.60
Spaghetti sauce	32 ounces for $3.20	26 ounces for $2.20
Mozzarella	12 ounces for $3.00	18 ounces for $4.00
Parmesan cheese	7 ounces $4.20	6 ounces for $3.00
Frozen pizza	9.2 ounces for $6.00	18 ounces for $13.50
Ice cream	2 quarts for $5.00	½ quart for $2.00

Food	Unit price for Brand 1	Unit price for Brand 2	Number of units needed	Total price	Total price for chosen foods
Tomatoes			2		
Salad			1 pound		
Italian dressing			2 ounces		
Garlic bread			6 ounces		
Spaghetti			1 package		
Lasagna			1 pound		
Spaghetti sauce			20 ounces		
Mozzarella cheese			12 ounces		
Parmesan cheese			4 ounces		
Frozen pizza			12 ounces		
Ice cream			½ quart		

Circle the brand with the lower unit price for each category. Compute the total amount you would spend for the amount needed, given in column four, and record your result in column five. Check your results on your calculator.

How would you explain to someone how to find the best buy?

_____
_____
_____
_____
_____

Which foods would you choose to serve?

_____
_____
_____
_____

How did you include your personal choice into the decision?

_____
_____
_____
_____

In addition to the main dish, you are serving salad with tomatoes and dressing and ice cream. Total the prices of the foods which you will serve.

_____
_____
_____
_____
_____
_____

-

Day 2

Homework

Show all work. Round answers to the nearest cent.

1. If three oranges cost $1.00, how much would you pay for five oranges?

2. If orange juice costs $2.50 for 64 ounces, how much would you pay for 6 ounces?

3. Find the unit prices for the following items:
   a. spaghetti sauce which costs $1.50 for 14 ounces

   b. pizza which costs $3.00 for 12.5 ounces

   c. chocolate chips which cost $2.00 for 10.5 ounces

Day 3

Menu

"Pasta Cuisine"

Entrees

Spaghetti w/ Marina Sauce		$11.95
Spaghetti w/ Alfredo Sauce		$12.50
Manicotti		$ 9.80
Cheese Ravioli		$ 8.65
Chicken Ravioli		$13.50
Pizza (2 slices)	Cheese	$ 5.40
	Pepperoni	$ 6.00
	Veggie	$ 4.95

Beverages

Soft Drinks	$ .95
Iced Tea	$ .95
Lemonade	$1.15
Coffee or Hot Tea	$1.00

Desserts

Chocolate Mousse Cake	$2.45
Raspberry Cheesecake	$2.60
Vanilla Ice Cream	$1.85

Sides

Garden Fresh Salad	$2.65
Caesar Salad	$3.25
Garlic Bread Sticks	$2.10

KIDS MENU - **10 and under**

Pizza (1 slice)	$3.85
Spaghetti w/ Marina Sauce	$4.50
Cheese Ravioli	$4.00

* All kids items are served with your choice of cold beverage and a scoop of vanilla ice cream.

Day 3

Activity 3

Directions: Using the menu **"Pasta Cuisine",** complete the following activities. Do all computations with paper and pencil, then you may use a calculator to check your answers before moving on.

A family of four has decided to dine at a new restaurant in their neighborhood. There are two adults, a child age 6, and a second child age 13. Each member of the family must order an item under each of the categories; entrée, beverage, and dessert. It is optional if they choose to order a side item. The family needs to stay within their budget, which cannot exceed $60.00. (Remember that a tax of 5% and a gratuity of 15% must be included in the total cost of the dinner.) How close can you come to spending the maximum without going over your budget?

1. Working with a partner, complete the table below:

Item	Adult 1	Cost	Adult 2	Cost	Child (6)	Cost	Child (13)	Cost
Entrée								
Beverage								
Dessert								
Side								
Total Cost								

2. Calculate the total cost of the family's meal. If you have gone over the budgeted amount and have not allowed for sales tax and gratuity, read just your selections and calculations at this time.

3. Find the 5% sales tax on the total cost of the dinner.

4. Calculate the total cost of the dinner, including the sales tax?

5. A gratuity of 15% must be added to your total bill since the service you received was excellent. Find 15% of your total bill.

6. Calculate the final cost of your dinner. Be sure you have included sales tax and gratuity.

7. How close did you come to staying within the budgeted amount, without going over?

Day 3

Homework

Round all answers to the nearest cent.

1. Find the sales tax on a pair of gloves that cost $16.58, if the tax is 6%.

2. Calculate a 4% sales tax on a watch that costs $43.55.

3. Find the total cost of a radio that sells for $87 and has a sales tax of 8 ½ %.

4. A compact disc sells for $12.98, find the total cost if the sales tax is 5.5%.

5. For lunch you order a hamburger which costs $1.69, an order of fries for $1.25, and a milkshake for $2.10. Calculate the total cost, if the sales tax is 7 ¼ %.

Performance Assessment

PART 1

Now it is time for you to plan and prepare a home cooked spaghetti dinner for your family of four. Use the information in the table below to complete the following activities. Show all work. You may use a calculator to check your work.

Items Needed To Prepare A Home Cooked Meal

Item	Store A		Store B	
Spaghetti Noodles	12 oz. box	$1.89	16 oz. box	$2.10
Marina Sauce	16 oz. jar	$2.29	20 oz. jar	$2.48
Garlic Bread	20 oz. loaf	$2.55	18 oz. loaf	$1.98
Salad – ready made	22 oz. bag	$3.08	20 oz. bag	$2.63

*** NOTE: All items will serve 2 people.**

1. Comparison shop for the best prices of the needed list of items above. Calculate all unit prices for both Store A and Store B, to determine which store has the better buys.

2. Which store has the better buys for the items needed to prepare the meal?

3. What is the total cost that you will be spending in order to prepare the meal? Note that there is no sales tax on food items in the grocery store.

PART 2

Your family of four has an event to attend this evening, therefore your mother will not have time to prepare a meal. She has asked you to phone in a carry-out order, and she will pick it up on her way home from work. Use the information in the table below to complete the following activities. Show all work. You may use a calculator to check your work.

Italian Carry-Out Menu

Item	Cost
Spaghetti w/ Marina Sauce	$16.82
Garlic Bread	$5.65
Garden Salad	$7.20

***NOTE: All items will serve 4 people.**

1. What will the total cost be for the carry-out order if you order all the items on the menu?

2. Calculate a 5% sales tax on the total cost of the meal. If necessary round to the nearest cent.

3. What will be the final cost of the meal including sales tax?

4. Which meal, the home cooked or the carry-out, is the least expensive, and by how much?

PART 3

1. Write a summary explaining how to calculate the unit price of an item. Remember to include specific examples using numbers to support your answers.

2. Write a summary explaining how to calculate the sales tax and final cost, when purchasing or ordering **several** items. Remember to include specific examples using numbers to support your answers.

RUBRIC – Activities 1 and 3

3 :

- The student has completed the data table.
- The student is able to use strategies to estimate sums and differences.
- The correct operation has been selected and all computations are accurate.

2 :

- The student has completed most of the data table.
- The student is able to use strategies to estimate some sums and differences.
- The correct operation has been selected and most computations are accurate.

1 :

- The data table is mostly incomplete.
- The student is inconsistent in applying estimation of sums and differences.
- The correct operation has been selected inconsistently and/or few computations are accurate.

0 :

- The data table is mostly incomplete.
- The student does not apply any strategy in the estimation of sums and differences.
- The selected operation is incorrect and/or the computations are inaccurate.

Day 2 Answer Sheet

Food	Unit price for Brand 1	Unit price for Brand 2	Number of units needed	Total price	Total price for chosen foods
Tomatoes	$0.97 each	$0.75 each	2	$1.50	
Salad	$1.13/lb.	$1.25/lb.	1 pound	$1.13	
Italian dressing	$0.19/oz.	$0.21/oz.	2 ounces	$0.38	
Garlic bread	$0.23/oz.	$0.24/oz.	6 ounces	$1.38	
Spaghetti	$1.50/pkg.	$1.20/pkg.	1 package	$1.20	
Lasagna	$1.40/lb.	$1.30/lb.	1 pound	$1.30	
Spaghetti sauce	$0.10/oz.	$0.08/oz.	20 ounces	$1.60	
Mozzarella cheese	$0.25/oz.	$0.22/oz.	12 ounces	$2.64	
Parmesan cheese	$0.60/oz.	$0.50/oz.	4 ounces	$2.00	
Frozen pizza	$0.65/oz.	$0.75/oz.	12 ounces	$7.80	
Ice cream	$2.50/qt.	$4.00/qt.	½ quart	$1.25	

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Day 2

Homework Answer Sheet

1. $1.00/3 = $0.33
   5 x $0.33 = **$1.65**

2. $2.50/64 = $0.4
   $0.4 x 6 = **$0.24**

3. a. $1.50/14 = **$0.11**

   b. $3.00/12.5 = **$0.24**

   c. $2.00/10.5 = **$0.19**

Day 3

Homework Answer Sheet

1. 6% = .06
   .06 x $16.58 = $0.9948
   = **$0.99 tax**

2. 4% = .04
   .04 x $43.55 = $1.742
   = **$1.74 tax**

3. 8 ½% = 8.5% = .085
   .085 x $87.00 = $7.395
   = $7.40 tax
   $87.00 + $7.40 = **$94.40 final cost**

4. 5.5% = .055
   .055 x $12.98 = $0.7139
   = $0.71 tax
   $12.98 + $0.71 = **$13.69 final cost**

5. $1.69 + $1.25 + $2.10 = $5.04 total
   7 ¼% = 7.25% = .0725
   .0725 x $5.04 = $0.3654
   = $0.37 tax

   $5.04 + $0.37 = **$5.41 final cost**

RUBRIC – Performance Assessment

3:

- The student completes all three parts of the assessment with no computational errors.
- The student shows all calculations when finding unit prices, totals, tax, and final costs of items.
- Summaries are written in a clear and concise order, exhibiting a full understanding of the concepts.

2:

- The student completes all three parts of the assessment with minimal computational errors.
- The student shows most of the calculations when finding unit prices, totals, tax, and final costs of items.
- Summaries are written with some level of understanding of the concepts.

1:

- The student completes two of the three parts of the assessment with major errors.
- The student shows some of the calculations when finding unit prices, totals, tax, and final costs of items.
- Summaries are written with little or no understanding of the concepts.

0:

- The student completes one or none of the three parts of the assessment with major errors.
- The student shows no calculations when finding unit prices, totals, tax, and final costs of items.
- No written summaries.